*A*lfaSpid Rotator RAS Controller Rot2Prog

For use with

*A*lfaSpid AZ/EL RAS

OR

*A*lfaSpid EL REAL

User Manual

DRAFT

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Table of contents

Introduction 3
Shipping Contents 3
Technical Data 3
Control Panel 4
Rear Panel 5
Installation 6
  Wiring connections 6
  Bench Testing of Control Box 7
Resetting the Controller 8
Controller Operation 9
  Function Mode 9
  Setup Mode (SETUP) 10
Mouse Controller 12

Please check with our web site for information on firmware updates, corrections, or changes to this information.

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Introduction

The *A*lfaSpid RAS (AZ/EL) rotator is an extra heavy-duty rotator designed to run large satellite antennas and comes complete with an electronic control unit. The rotator is designed to be mounted pipe to pipe or on an optional adaptor plate for conventional in tower mounting. It can also be mounted outside of the tower on the mast, or used in a side mount configuration.

Shipping Contents

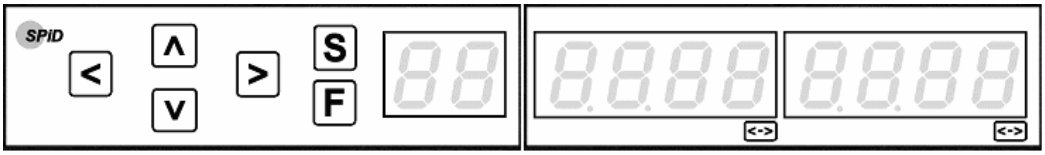
RAS Rotator 1
Rot2Prog controller 1
Spare Fuses 1
Custom Mouse 1

Technical Data

Rot2Prog and RAS
Input Voltage (Typical) ..... 12 – 18 Volts AC/DC
Input Current (Nominal Draw) ..... 3 – 5 Amps
Motor ..... 13.8 – 18 Volts DC
Fuse ..... 8.0 AMP GMA
Rotation Speed (azimuth) ..... 120 sec (12 V) / 80 sec (18 V)
Rotation Speed (elevation) ..... 120 sec (12 V) / 80 sec (18 V)

Controller must have => 13.8 Volts DC or AC for correct operation

Control Panel



Buttons

< - Left (Decrease)
^ - Up (Increase)
v -Down (Decrease)
> - Right (Increase)
S - Setup (configuration)
F - Function

Indicators

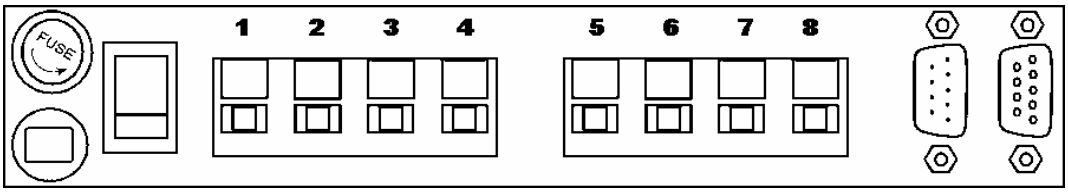
<-> -Dot Overlap - Over travel

7 segment 4-digit display

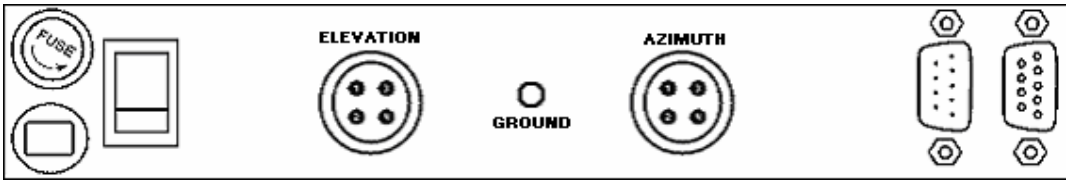
- Multifunction display

Elevation Azimuth

Rear Panel

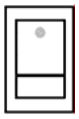


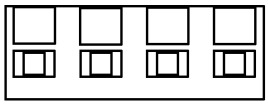
or

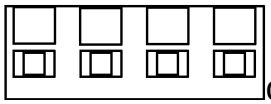


-Fuse Holder

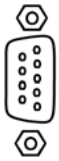
- Power Cord


- Power Switch


or - Terminal Strip for azimuth control (1,2,3,4)


or - Terminal Strip for elevation control (5,6,7,8)

-DB-9 connector (male)


-DB-9 connector (female)

Installation

Wiring Connections

> ⚠ TIP:
> Before final installation of equipment, it is strongly suggested you check out all functions and connections on a workbench.

The rotator unit must be wired to the control unit with 8 wires cable. 4 wires – azimuth (1,2,3,4) and 4 wires - elevation (5,6,7,8). Diameter of wires in cable to connect the control unit to the rotator depends upon the distance between rotator and controller. The wire for the impulse sensing may be quite thin - #22 or similar, even for relatively long distances.

Length (distance)	Gauge Motor
10 m (32')	#18 (1.19 mm)
30 m (100')	#16 (1.42 mm)
60 m (200')	#14 (1.75 mm)

> ⚠ CAUTION:
> Do not accidentally switch the motor wires with the impulse wires.

Remove cover from the rotator and make connections as follows:

Azimuth:
1 Motor Drive to 1 on controller terminal
2 Motor Drive to 2 on controller terminal
3 Impulse Sense to 3 on controller terminal
4 Impulse Sense to 4 on controller terminal

Elevation:
5 Motor Drive to 5 on controller terminal
6 Motor Drive to 6 on controller terminal
7 Impulse Sense to 7 on controller terminal
8 Impulse Sense to 8 on controller terminal

Bench Testing of Control Box

The control box is normally expected to be operated from a 13.8 Volt DC supply, however it may be operated from other unregulated DC or AC sources as well. The output of supply source must be from 13.8 to 18 V, 6 Amps minimum.

The polarity of the power to the control box input leads is not critical, as a full wave bridge rectifier on the input will provide the proper polarity to the electronics.

TIP: *Because of several steering diodes in the motor path, the voltage delivered to the motor (neglecting wire loss)* ***will be about 1.4 volts less than the power supply voltage.*** *For longer runs and/or thin wiring a higher voltage (up to approx 18V) to the control unit is beneficial. A simple way to estimate if the voltage to the motor is adequate is by timing the rotation. Under no or a very small load, the 360 degree rotation time with 12V DC at the motor is about 120 seconds (2 minutes). With 18 V DC is about 80 seconds (1 minute). A DC Ammeter in the motor lead is also useful. It should indicate between 2 and 3 amps with a small load. On windy days or heavy load, the current may fluctuate up to 3 to 5 amps per motor.*

Notes – testing and troubleshooting

It is highly recommended to ground the Control Box.

Azimuth:

Pressing [>] should make the rotator move clockwise.
Pressing [<] should make the rotator move counter-clockwise**.**

If rotation is reversed, switch lines 1 and 2 on the back of the controller.
Impulse sense lines (3 & 4) have no polarity concerns.

Elevation:

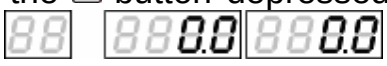
Pressing [∧] should make the rotator move up.
Pressing [∨] should make the rotator move down.

If rotation is reversed, switch lines 5 and 6 on the back of the controller.
Impulse sense lines (7 & 8) have no polarity concerns.

Part of the overload protection circuitry involves removing motor power if the controller receives no sense indication. If the motor turns for a few seconds and then you hear the relay in the control box drop out, the motor has either stalled or there is a problem in the impulse sense wiring. **The controller has not detected motor movement.**

Turn the unit OFF.

Resetting the Controller

While holding the F button depressed, turn control unit back on. This will now show  on the display.

This feature can be used if, for any reason, the direction of the antenna becomes incorrect. This may be caused by antenna to mast slippage or incorrect initial alignment. Re-alignment may be necessary.

IMPORTANT:

Azimuth

In order to set the limits for both the Azimuth and the Elevation sections of the rotator, first always start by setting up the azimuth section by pointing the rotator to 0 degrees or true north. Now reset the controller as previously outlined above. The controller is now set for azimuth.

The *A*lfaSpid rotator is now set at the counter-clockwise end of its normal rotation range. Normal rotation range is in a clockwise direction for 360 degrees.

From the reset position, you can rotate counter-clockwise an additional 180 degrees in over-travel, as well 360 degrees clockwise, plus an additional 180 degrees into clockwise over-travel.

Counter-clockwise over-travel is indicated by a steady dot above the over-travel icon <-> . <-> . Rotation past 359 degrees into the clockwise over-travel is indicated by a blinking dot above the over-travel icon. <->

Elevation

Elevation, must be set to zero. To do this the controller and rotator must be positioned to zero degrees, both electronically and mechanically. Using the display down arrow (or the mouse) move the rotator to the full travel, which should be about (- 21.0). If the rotator stops and the display is not -21.0 then the mechanical stop in the rotator has been activated. After display on the controller reads -21.0 (or its lowest value) reset the unit by pressing the “F” button and turning on the power at the same time. Again, using the display down arrow (or the mouse) move the rotator to the full travel, which should be about (- 21.0), repeat this until there is no more travel.

Press the display up arrow until the 10.0 degree mark is met. Do a reset. Test for a full 180 degrees of travel. If it travel is 180 degrees or more then setup is correct. If it does not then repeat the process until it does. See section on “PP” for minor adjustments

Controller Operation

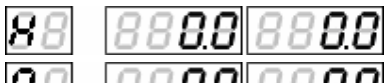
Technical Note:

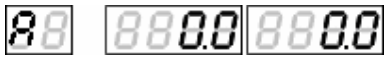
The *A*lfaSpid controller has multiple modes of operation. You will need to become familiar with these modes to be able to make full use of your rotator.

[F] Function Mode

The [F] button steps through the function menus. The leftmost character on the display indicates the function mode you are currently in.

- Normal Operations Mode

 - Half Auto Mode

 - CPU Mode

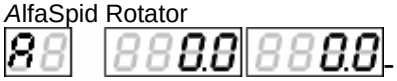
> ⚠ The 0 in the displays to the left will be replaced by your actual beam heading.

Normal Operations

In Normal Operations Mode, the [<], [∧], [∨], [>] buttons cause rotation as long as the buttons are pressed. Pressing [S] while in normal operations mode will take you to setup mode.

- Half Auto Mode

In Half Auto Mode, the [<], [∧], [∨], [>] buttons can be used to pre-select the desired beam heading. The heading displayed on the controller will rapidly change in the direction of desired rotation. Once the desired beam heading is shown on the display, release the key. Approximately ½ of a second after no key presses have been detected, the display will revert back to the actual beam heading, and rotation towards the desired heading will take place. Pressing any key while in transit to the desired heading will cancel the action.

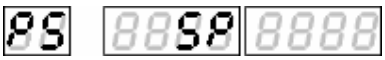
 - Auto (CPU) Mode

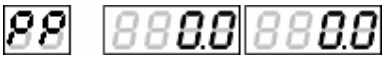
In Auto Mode, the controller will respond to commands from control software running on an attached computer. The <, ∧, ∨, > buttons can still be used, but pressing of any of them will cause cancelling the data from software.

S Setup Mode

The S button steps through the setup menu, for modes other than manual control operate as **STOP**. The display cycles through each of the setup menu items.

- Rotator Transmission

 - Program Simulation

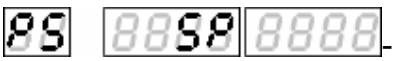
 - Heading Adjust

- Programmable High Limit Default flashing "DOT" 180

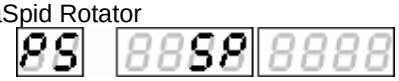
- Programmable Low Limit Default not flashing "DOT" 180

- Rotator Transmission

This value defines the resolution of controller operation.
1.0 means operating with 1 degree accuracy, 0.5 means 0.5 degree accuracy. On customized units this may be some other value.
0.25, 0.5, 1.0

 - Program Simulation

Program Simulation allows the user to set the serial communication protocol used by the rotator. When set to emulate another brand of rotator, the AlfaSpid will respond to commands.
If your favourite software supports a rotator, chances are, the AlfaSpid will be able to interface to your software. There are 2 modes available:

 - *A*lfaSpid

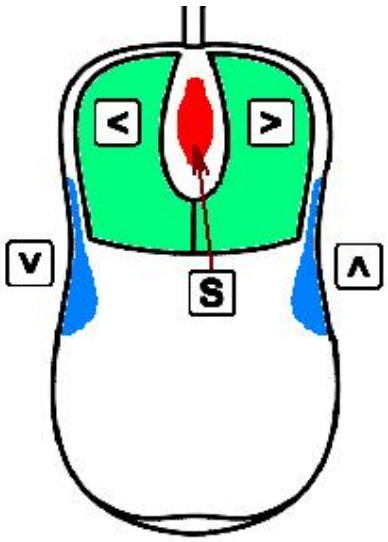
- Yaesu

(GS232 protocol, 600 baud N, 1, 8 bits)
(Data rate 600, 1 STOP bit, no even parity bit)
Operating mode change <, >.

- Heading Adjust

This setting can be used to make minor heading adjustments without causing the rotator to turn. If you notice that the heading displayed on the controller to a known signal source is out by a few degrees, you can change the heading displayed on the LED readout to match the known heading, rather than having to turn back to North and reset the controller. These settings are made by <, ∧, ∨, > buttons.

Mouse Controller



The optional mouse controller allows easy desktop access to the most commonly used front panel controls. These buttons are functionally equivalent to the corresponding front panel controls.

< - Left (Decrease)
^ -Up (Increase)
v -Down (Decrease)
> - Right (Increase)
S Setup Mode or **STOP**

⚠ The mouse controller is a highly modified computer mouse. You can not use a regular mouse with the *A*lfaSpid rotator nor vice-versa.

The mouse ball serves no function.

Alfa Radio Ltd. Trouble shooting tips

Before contacting AlfaRadio Ltd. Please make the following tests:.

NOTE: ON THE **ELEVATION ROTATOR** THERE ARE MECHANICAL SWITCHES WHICH OPEN THE POWER WHEN THE END LIMIT IS REACHED. A DIODE IS PLACED IN SERIES WITH THE MOTOR. TO TEST FOR THIS, REVERSE THE POWER TO THE MOTOR.

The following are some trouble shooting tips, if for some reason your AlfaSpid will not operate correctly.

It is important to confirm correct operation before installing on the tower. This will rule out any damage that may have been caused by the shipping company.

Check the Limits - PH and PL settings and rule out overlap.

Simple resistance tests can reveal incorrect or shorted wiring.

Pins 1 and 2 are the motor winding and will have a low resistance. Typical 2-3 ohms.

Pins 3 and 4 are the sense lines and typically will have either an open circuit or have about 1200 ohms depending on the status of the reed switch in the rotator and the length and gauge of used wire.

There should be no conductivity between 1 and 3 or 1 and 4, or between 2 and 3 or 2 and 4

All lines should have no conductivity to ground.

Be careful not to over wind your coax with the next test, as there will be no protection from over turning.

Find a small 12 volts supply which will deliver 3 to 4 amps. (a small 12 Volt battery will work just fine)
To confirm that the motor runs you may connect 12 volts D.C. to the lines that go to the motor, pins 1 and 2, it should turn. Reversing the 12 Volts D.C. should cause the motor to turn in the reverse direction.

NOTE: ON THE ELEVATION ROTATOR THERE ARE MECHANICAL SWITCHES WHICH REMOVES THE POWER TO THE MOTOR WHEN THE END LIMIT IS REACHED. A DIODE IS PLACED IN SERIES WITH THE MOTOR. TO TEST FOR THIS REVERSE THE POWER TO THE MOTOR, THE UNIT SHOULD TURN.

To confirm that the sense circuit in the rotator is working, connect an ohm meter to the senses lines pins 3 and 4, apply 12 volts to the motor lines pins 1 and 2; you should see the ohm meter reading alternate between open circuit and about 1200 ohms.

Pin on Rotator not controller	Typical Reading	Your reading	
Pins 1 to 2	About 2 to 4 Ohms	_____	Depends on the length of wire to rotator
Pins 3 to 4	Open or 1200 Ohms	_____	Depends on the status of the read switch
Pins 1 to 3	Open	_____	
Pins 2 to 3	Open	_____	
Pins 2 to 4	Open	_____	
		_____	
Pin 1 to Ground	Open	_____	
Pin 2 to Ground	Open	_____	
Pin 3 to Ground	Open	_____	
Pin 4 to Ground	Open	_____	
		_____	
Voltage on controller			
Pins 1 to 2	About 12 volts with motor running		Depends on the supply voltage (14 volt applied)
Pins 3 to 4	About 8.5 volts or 2.5 volts		Depends on the status of the read switch and the Supply voltage

12 MONTH LIMITED WARRANTY

AlfaSpid Rotator and controller

Alfa Radio Ltd. Warrants to the user, who originally purchased the product, that the product will be free from defects in material and workmanship for the following periods after such date of purchase: Material, 12 months : Workmanship, 12 months.
Alfa Radio Ltd. will, at its option, repair or replace free of charge such defective products subject to the following conditions:

1. Delivery of the product prepaid to Alfa Radio Ltd. or its authorized dealer.
2. Determination by the Alfa Radio Ltd. that a defect exists and is covered by the limited warranty. Defects due to alteration, pinning the mast to the rotator, repair by an unauthorized person, misuse, accidental damage, lightning strikes, use of the equipment for purpose other than those for which it was designed, and the like, are NOT COVERED by this limited warranty. Repairs therefore will be subject to normal service charges.
3. Repairs and replacement parts are covered under this limited warranty only for the remaining term of the original limited warranty.
4. Under no circumstances is Alfa Radio Ltd. liable for consequential damages to person(s) or property by the use of this product.
5. Alfa Radio Ltd. reserves the right to make changes or improvements in design or manufacture or firmware without incurring any obligations to install such changes upon any of the product previously manufactured.

All claims of defects or shortage should be sent prepaid to:

Alfa Radio Ltd.
11211 - 154 Street
Edmonton, Alberta
T5M 1X8
CANADA

All shipments must be accompanied by the letter describing the problem in detail along with a copy of your proof-of-purchase.

Contact AlfaRadio for authorization before shipping.
www.alfaradio.ca 780 446 8958

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Addendum to AlfaSpid Controller Manuals:

The new AlfaSpid Controllers “Rot1Prog_USB” and “Rot2Prog_USB” operate the same as the older Rot1Prog and Rot2Prog controllers with the exception of the serial connection.

In the new USB Versions, the RS232 connection and the internal interface chip have been replaced with a USB “A” Connector and a FTDI FT232RL interface chip. If the computer being used to control the AlfaSpid Controller has already been used with another device that uses the FTDI chip, then it will already have the appropriate drivers loaded. If not, the drivers will need to be loaded the first time the controller USB port is connected to the Computer.

Some Operating systems have FTDI drivers that will automatically load. If your system does not, then go to the FTDI site listed below:
http://www.ftdichip.com/Support/Documents/InstallGuides.htm

Follow the installation manual for your computer and operating system. Then go to the following site and download the current driver for your operating system:
http://www.ftdichip.com/Drivers/VCP.htm

Follow the instructions and install the proper driver.

When complete, go to the Device Manager, expand the “Ports (COM & LPT)”, determine which COM port has been assigned to the USB interface, then set-up your controller software with that COM port.

Experimentation done at Alfa Radio Ltd. has determined that no other set-up is required. Ensure that the AlfaSpid Controller is in the “A” mode, run the PC program and enjoy.